SOV/129-59-1-3/17

AUTHORS: Blanter, M.Ye., Doctor of Technical Sciences, Professor and Mashkov, A.K., Engineer

TITLE: Anomalous Changes in the Properties of Alloys During Phase Transformations (Anomal'nyye izmeneniya svoystv splavov v protsesse fazovykh prevrashcheniy)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 1, pp 6 - 10 (USSR)

ABSTRACT: It follows from general considerations that some atoms of an alloy which participate in the process of phase transformation are in a particular state in which the transfer of atoms from one crystal lattice to another is probably accompanied by a temporary weakening of the inter-atomic bond forces. This should bring about an anomalous change of a number of physico-chemical and mechanical properties of the alloys and if these changes are of sufficient magnitude, they can be detected by known methods of investigation. These anomalous effects will apparently be of a different nature than the increase in ductility during hardening and tempering of steel which was observed earlier by Kayushnikov, P.Ya. (Ref 1) and has also been investigated by Vorob'yev (Ref 2) and Gol'denberg (Ref 3). Obviously, an orientated decomposition

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and directional diffusion cannot bring about anomalous changes of such properties as the electric conductivity for instance. The aim of the work described in this paper was to establish the presence of similar effects in the changes of the electric resistance and resistance to plastic deformation. For this purpose, the kinetics of the phase transformations of the investigated alloys were studied first and from the obtained kinetic diagrams, thermal regimes were determined which are suitable for studying the character of the property changes. The anomalous changes in the electric resistance during phase transformations were investigated on a steel containing 9.18% Cr, 0.02% C, 0.16% Mn and 0.19% Si. The determined diagram of the isothermal transformation of the alloy is graphed in Figure 1, p 7. 3 mm dia, 30 mm long specimens were austenised at 900 °C (the Ac_3 range was 815 to 850 °C) with a holding time of 5 min. In Figure 2, the change in the specific electric resistance during the phase transformation and the curves of isothermal transformation at 615 °C are graphed. In Figure 3, the change is graphed

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Anomalous Changes in the Properties of Alloys During Phase Transformations

of the speed of transformation, the electric conductivity and the degree of transformation during isothermal annealing at 615 °C. The correlation between the speed of transformation and the magnitude of the anomalous increase in electric conductivity is graphed in Figure 4. The anomalous change of the resistance to plastic deformation during phase transformation was studied by measuring the hardness of an alloy containing 0.06% C, 22.15% Ni, 2.52% Mn, 0.047% Si. The diagram of isothermal transformation of austenite and martensite for this alloy is graphed in Figure 5. The change in the hardness of the austenite-martensite mixture during isothermal transformation (at -29 °C) is graphed in Figure 6. It was found that during phase transformation, anomalous changes took place in the electric conductivity and the resistance of the material to plastic deformation. These anomalous changes (appreciable increase of the electric conductivity and decrease of the resistance to plastic deformation) coincide with the period of intensive transformation. These anomalous changes indicate that the metallic alloys are in a particular

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Anomalous Changes in the Properties of Alloys During Phase Transformations

state during phase transformations. These anomalous changes in the properties are characterised by a weakening of the interatomic bonds and an acceleration of the processes of plastic deformation and electron transfer. Therefore, it is necessary to treat with caution resistance curves determined during the process of transformation, before the state of the alloy has been stabilised by hardening. There are 6 figures and 4 Soviet references.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Engineering Institute)

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SOV/180-59-3-13/43

AUTHORS: Blanter, M.Ye. and Kuznetsov, L.I. (Moscow, Omsk)

TITLE: The Connection between Softening During Removal of Cold Work and Temperature Softening of Nickel Alloys

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 75-82 (USSR)

ABSTRACT: The two processes of softening appear, at first glance, to be unconnected processes. Alloys tested were binary alloys of nickel with molybdenum, chromium, tungsten, titanium, cobalt and aluminium. Chemical compositions are given in the table. The degree of softening was followed by measuring hardness at various stages. Samples were given 5, 10, 25 and 38% deformation and heated to various temperatures. The temperature of half-softening was measured, i.e. the temperature at which the hardness was the arithmetic mean of the cold worked and the unworked material. Fig 1 shows the effect of alloying content on the half-softened temperature. With 5% deformation, W, Mo and Cr have the greatest effect. At higher degrees of deformation Cr and W have the greatest effect. There already existed data on the hardness of undeformed alloys at various temperatures (Ref 3); from these it could be seen that the hardness test itself introduced cold work.

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SOV/180-59-3-13/43

The Connection between Softening During Removal of Cold Work and Temperature Softening of Nickel Alloys

At higher temperatures, recrystallisation also took place so a characteristic bend in the hardness-temperature curve was obtained (the critical temperature). Fig 2 shows the effect of Mo additions on the hardness - temperature curve. Fig 3 shows the influence of alloying elements on the critical temperature. 0.5% W or Mo and 2% Cr have a pronounced influence. Thus an increase in critical temperature and an increase in the half-softened temperature are both brought about by the same alloying additions. This is because the hardness test itself introduces cold work. Elements which have the strongest effect are those which form strong interatomic bonds and have the greatest values for heat of self-diffusion. The relation between the critical temperature and the temperature of half-softening is shown in Fig 4 for Ni - Mo alloys and in Fig 5 for Ni - Cr, Ni - Ti and Ni - Co alloys. There are 5 figures, 1 table and 24 references, 13 of which are English,

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The Connection between Softening During Removal of Cold Work and Temperature Softening of Nickel Alloys

5 German and 6 Soviet.

SUBMITTED: October 24, 1958

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BLANTER, M Ye

PHASE I BOOK EXPLOITATION SOV/5457

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sektsiya metallovedeniya i termicheskoy obrabotki metallov.

Metallovedeniye i termicheskaya obrabotka metallov; trudy Sektsii metallovedeniya i termicheskoy obrabotki metallov (Physical Metallurgy and Heat Treatment of Metals; Transactions of the Section of Physical Metallurgy and Heat Treatment of Metals) no. 2. Moscow, Mashgiz, 1960. 242 p. 6,000 copies printed.

Sponsoring Agency: Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Tsentral'noye pravleniye.

Editorial Board: G. I. Pogodin-Alekseyev, Yu. A. Geller, A. G. Rakhshtadt, and G. K. Shreyber; Ed. of Publishing House: I. I. Lesnichenko; Tech. Ed.: B. I. Model'; Managing Ed. for Literature on Metalworking and Machine-Tool Making: V. I. Mitin.

PURPOSE: This collection of articles is intended for metallurgists, mechanical engineers, and scientific research workers.

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COVERAGE: The collection contains articles describing results of research conducted by members of NTO (Scientific Technical Society) of the machine-building industry in the field of physical metallurgy, and in the heat treatment of steel, cast iron, and nonferrous metals and alloys. No personalities are mentioned. Most of articles are accompanied by Soviet and non-Soviet references and contain conclusions drawn from investigations.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress (TN672.N34)

VK/wrc/jw
9-12-61

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000205510003-5"

24589

S/137/61/000/005/043/060
A006/A106

18 7500

AUTHORS: Blanter, M. Ye.; Kuznetsov, L. I., and Metashop, L. A.

TITLE: Softening and recrystallization processes in iron and nickel alloys

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 5, 1961, 35, abstract 5Zh282 ("Metallovedeniye i term. obrabotka metallov" [Tr. Sektsii metalloved. i term. obrabotki metallov. Tsentr. pravl. Nauchno-tekhn. o-va mashinostroit. prom-sti, no. 2] Moscow, 1960, 3-11)

TEXT: The authors analyze some problems connected with the investigation of the effect of alloying elements on recrystallization processes in Fe and Ni base alloys. The effect of alloying on softening of preliminary cold deformed alloys during heating was studied on binary Ni alloys (with Cr, W, Mo, Al, Ti and Co) and manganous austenite (Ø13 type) additionally alloyed with Ni, Co, Cr, W and Mo. It is shown that the half softening temperature of Ni-alloys is most increased by W, Cr and Mo and least by Ti, Al and Co. An increase of the degree of plastic deformation from 10 to 38% reduces the degree of stability of the alloys against removal of case hardness. In the case of alloyed austenite the addition of Ni and Co reduces the temperature range of softening; W has a lesser

X

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80193
S/129/60/000/04/001/020
E073/E535

18.7500

AUTHOR: Blanter, M.Ye., Doctor of Technical Sciences, Professor

TITLE: Thermodynamic-Mechanical Theory of Martensitic Transformations

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, No 4, pp 2-15 (USSR)

ABSTRACT: This work was presented and discussed at a seminar of heat treatment metallurgists of NTO Mashprom in Sverdlovsk on December 16, 1959. In this extensive review paper (67 references), it is shown that existing theories do not explain experimental data satisfactorily. A new theory is put forward which can be formulated as follows: the motive force of the transformation is the tendency to the formation from the austenite of martensite with less free energy. This is not materialized by the formation of nuclei of the critical dimension or as a result of thermal or mechanical stresses but as a result of synchronous directed group movement of atoms due to thermal fluctuations. A cooperative displacement of atoms takes place which is equivalent to that occurring under the

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Thermodynamic-Mechanical Theory of Martensitic Transformations

action of tangential stresses which exceed the critical shear strength. It is pointed out that germination of martensite plates in this way can occur only in the presence of dislocation imperfections in the austenite. If for martensite formation displacement of atoms is required which exceeds the magnitude of elastic displacement (for ferrous alloys), the growth process is similar to that of the process of sliding in the case of plastic deformation. This determines the independence of the speed of growth of martensite plates on temperature. The speed of germination changes according to a complex law under the effect of an increase of the difference of free energies and a drop in the probability of the cooperative shift with increasing supercooling. Depending on the location of the curves (probability of combined slip, slip energy and difference of the free energies), a thermal, isothermal or mixed martensite formation may occur.

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80193
S/129/60/000/04/001/020
E073/E535

Thermodynamic-Mechanical Theory of Martensitic Transformations

There are 7 figures and 67 references, 41 of which are Soviet, 5 German, 2 French and 19 English.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All Union Correspondence Engineering Institute)

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S/148/60/000/011/014/015
A161/A030

AUTHORS: Blanter, M. Ye., Mashkov, A. K.

TITLE: Strength variations in the process of the alpha-gamma transformation in alloyed iron

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 11, 1960, 133 - 142

TEXT: The mechanical properties of armco iron and of alloy steel in the allotropic transformation stage had been studied previously, and the peculiar, spontaneous increase of plasticity had been noticed in two works (Ref. 9: Tamaki. J. Japan. Inst. Metals, 1955, No.2, 19 and Ref. 10: P.Ya. Kayushnikov. Sb. "Peredovoy opyt proizvodstva ("Advanced production experience"). Goryachaya obrabotka metallov", 1956). The authors of this article studied this in the cases of direct and reverse martensitic transformation (Ref. 11 and 12: Blanter and Mashkov, in "Metallovedeniye i termicheskaya obrabotka metallov", 1959, No. 1 and No. 11), and stated that the alpha-gamma transformation intervals are limited with the points A_1 and A_3, i.e., that the first stage of transformation is from pearlite

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Strength variations in the ....

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A161/A030

into austenite ($\alpha + \kappa \rightarrow \gamma$), and the following is pure alpha-gamma transformation. The behaviour of metal in the $\alpha - \gamma$ transformation in the absence of the point A_1 is of practical interest. It has been studied in the described experiments with Fe-Cr alloys (in view of the very extensive use of Cr for alloying), i.e., armco iron with Cr, in five different combinations. The metal was melted in an induction furnace, homogenized at 1200°C for 5 hours, then the ingots were forged into rods 12 mm in diameter, and their mechanical properties at an interval of $\alpha - \gamma$ investigated, and the limits of the interval determined by preliminary dilatometric analysis. The experiment results are illustrated in a series of graphs. The characteristical "dips" on the hardness curves (Figure 6) were observed, and the curves stated to run roughly parallel to the Cr content. The difference of 7.1% Cr (between the minimum and maximum in the five compositions) caused a difference in hardness of $5 \frac{1}{2}$ 10 kg/mm^2. The authors think that the "dip" of strength (Figure 7) is connected with the effects of two factors: one leads to the strengthening and is connected with the formation of phase hardening on account of the difference in the specific volumes of ferrite and austenite (curve 1), and the other is the temporary weakening of the

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A161/A030

Strength variations in the ....

bond between atoms regrouping into a new crystalline grid. The maximum strength drop is in the mid of the interval (curve 2 in Figure 7). A uniform strength reduction through the whole interval must continue,, too, on account of the recrystallization process. The effect of the factors increases (curve 3). The peaks at the beginning and end of the transformation interval are due to the effect of the phase hardening. There are 7 figures and 12 references: 8 Soviet and 4 non-Soviet. One reference is English and reads as follows: (Ref. 2) A. Sauveur. Trans.Am. Soc. for Steel Tr., 1930, XVII, No. 3.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Institute of Machine Building).

SUBMITTED: February 20, 1960

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A161/A030

Strength variations in the ....

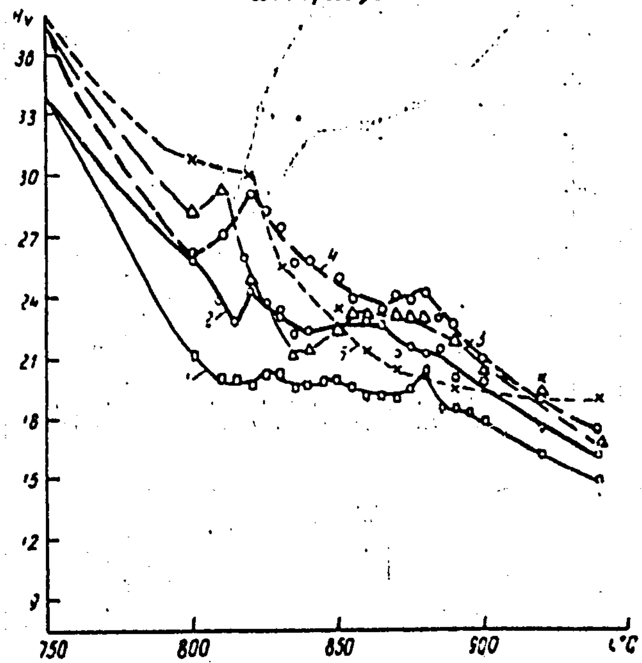

Figure 6: Hardness variations with temperature (°C) in $\alpha - \gamma$ transformation in the five alloys: (1) with 4.32 % Cr; (2) 6.58 % Cr; (3) 9.18% Cr; (4) 11.52 % Cr; (5) 12.63% Cr.

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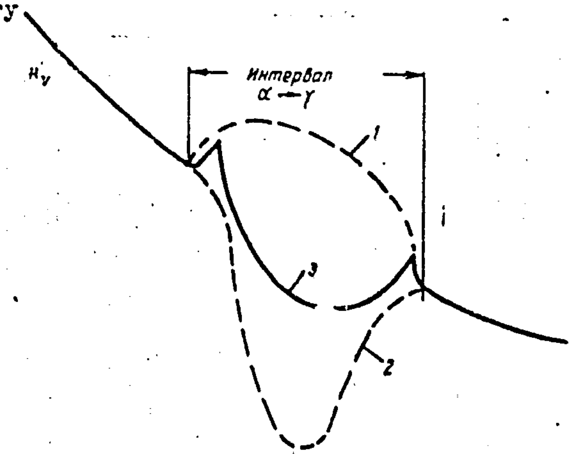
Strength variations in the ....

Figure 7: (1) strengthening by phase hardening; (2) weakening through weaker atomic bonds; (3) the summary effect.



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S/129/60/000/012/001/013
E193/E283

AUTHORS: ~~Blanter, M. Ye.~~, Doctor of Technical Sciences, Koryagin, K. P. and Martishin, O. V., Engineers

TITLE: Low-Carbon Unalloyed Steels as a Substitute for Certain High-Strength Alloy Steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, No. 12, pp. 2-7

TEXT: The object of the present investigation was to explore the possibilities of replacing expensive alloy steels of the 30XΓCA (30KhGSA) type with suitably heat-treated, unalloyed, low-carbon steels "10" and "15", whose composition is given below.

Steel	Contents of elements in %								
	C	Mn	Si	S	P	Cr	Ni	Cu	Al
10	0.13	0.58	0.27	0.03	0.022	0.07	0.11	0.14	0.053
15	0.16	0.62	0.24	0.032	0.026	0.10	0.13	-	0.026

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Low-Carbon Unalloyed Steels as a Substitute for Certain High-Strength Alloy Steels

To this end, the effect of hardening (quenching) temperature, temperature of the quenching medium (8-10% aqueous solution of sodium hydroxide), and tempering temperature on the U.T.S., 0.2% proof stress ($\sigma_{0.2}$), reduction of area (ϕ), elongation (δ), impact strength (a_k), fatigue strength, and microstructure of these steels, was studied, the mechanical tests having been conducted at temperatures varying between 20 and 500°C (-70 and 500°C in the case of a_k). The following conclusions were reached. (1) Increasing the temperature of the quenching medium from 0 to 50°C, brings about a considerable (approximately 70%) increase in a_k of steels 10 and 15, but does not affect any of the other properties. (2) The best combination of mechanical properties is obtained by quenching from 900-930°C and tempering at 300-350°C. Steel 15, tempered at 300°C, had U.T.S. = 120 kg/mm^2, $\sigma_{0.2}$ = 100 kg/mm^2, δ = 11%, ϕ = 38%, and a_k = 11 kgm/cm^2. This treatment also lowered the temperature of the ductile→ brittle transition to below -70°C.

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Low-Carbon Unalloyed Steels as a Substitute for Certain High-Strength Alloy Steels

(3) The different response of steels studied to various heat treatments is associated with their different carbon and aluminium contents and reflected in the micro-structure of these steels which is finely crystalline in the case of Steel 10, and coarsely crystalline in the case of Steel 15. (4) Hardened and tempered Steels 10 and 15 display best combination of mechanical properties at temperatures above 300°C. (5) Heat-treated Steels 10 and 15 have U.T.S. equal to, and ϕ, δ, and a_k higher than, those of similarly treated steel 30KhGSA. The fatigue limit of hardened Steel 15 amounts to 41 kg/mm^2 and is 14% lower than that of steel 30KhGSA. (6) Subject to receiving suitable heat treatment, Steels 10 and 15 can be used in many applications as a substitute for high-strength alloy steels. There are 8 figures, 2 tables and 5 Soviet references.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Institute of Machine Building)

Card 3/3

BLANTER, M. Ye.

PHASE I BOOK EXPLOITATION SOV/5511

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Kiyevskoye oblastnoye pravleniye.

Metallovedeniye i termicheskaya obrabotka (Physical Metallurgy and Heat Treatment of Metals) Moscow, Mashgiz, 1961. 330 p. Errata slip inserted. 5,000 copies printed.

Sponsoring Agency: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov UkrSSR. Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Kiyevskoye oblastnoye pravleniye.

Editorial Board: M. P. Braun, Doctor of Technical Sciences, I. Ya. Dekhtyar, Doctor of Technical Sciences, D. A. Draygor, Doctor of Technical Sciences, I. S. Kamenichnyye, Engineer, Ye. A. Markovskiy, Candidate of Technical Sciences, V. G. Permyakov, Doctor of Technical Sciences, and A. V. Chernovol, Candidate of Technical Sciences; Ed.: M. S. Soroka; Tech. Ed.: M. S. Gornostaypol'skaya; Chief Ed., Mashgiz (Southern Dept.): V. K. Serdyuk, Engineer.

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PURPOSE: This collection of articles is intended for scientific workers and technical personnel of research institutes, plants, and schools of higher technical education.

COVERAGE: The collection contains papers presented at a convention held in Kiyev on problems of physical metallurgy and methods of the heat treatment of metals applied in the machine industry. Phase transformations in metals and alloys are discussed, and results of investigations conducted to ascertain the effect of heat treatment on the quality of metal are analyzed. The possibility of obtaining metals with given mechanical properties is discussed, as are problems of steel brittleness. The collection includes papers dealing with kinetics of transformation, heat treatment, and properties of cast iron. No personalities are mentioned. Articles are accompanied by references, mostly Soviet.

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S/129/61/000/011/002/010
E111/E135

AUTHORS: Blanter, M.Ye., Doctor of Technical Sciences, Professor, and Novichkov, P.V., Engineer

TITLE: Kinetic and geometrical characteristics of the martensite transformation in an iron-nickel-manganese alloy

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1961, 12-19 (+ 1 plate)

TEXT: In previous work (Ref.1: M.Ye. Blanter, Metallovedeniye i termicheskaya obrabotka metallov, no.4, 1960) the first of the present authors examined reasons for the rate of growth of martensite crystals in iron alloys being independent of temperature, whereas the rate of nucleation should generally follow a curve with a maximum. He showed (Ref.3: M.Ye. Blanter, Metodika issledovaniya metallov i obrabotka opytnykh dannykh, Metallurgizdat, 1952) that a proposed method (Ref.2: G.V.Kurdyumov, O.P. Maksimova and T.V. Tagunova, Problemy metallovedeniya i fiziki metallov, 2nd issue, Metallurgizdat, 1951) for calculating the activation energy was unsatisfactory. The present authors

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have investigated the effect of temperature and degree of transformation on the rate of appearance of centres and the sizes of martensite crystals in iron alloys under purely isothermal transformation conditions. From the relations obtained the activation energy and the work of formation of martensite-crystal nuclei were found. The data obtained confirm the dislocational nature of the martensite transformation. The authors point out that for the purely isothermal transformation it is practically impossible to count the number of crystals in the plane of the polished section. However, the thickness, a, of martensite crystals can be quantitatively determined. Taking the martensite crystal to be a flat parallelipiped (in principle any shape would do) of sides a, b, b, the number of crystals, N, formed in a given time interval is given by:

$$N \frac{1}{mm^3} = \left(\frac{S \cdot a - 2V}{4a \sqrt{aV}}\right)^2 \quad (3)$$

Here, V is the relative volume of the magnetic component (martensite) determined magnetometrically and S the martensite-crystal surface per unit volume, determined by the method of random intercepts. The errors in determinations of a and the volume of the martensite phase were 5%, and 1.2-1.4% respectively. The isothermal transformation was investigated on an iron alloy with 23.02% Ni and 3.35 Mn. The results cannot be extended to other iron alloys, especially steels, where the isothermal martensite transformation is practically absent. On cooling in air from 1200 °C the martensite point is at 10 °C, subsequent cooling in liquid nitrogen producing 72% martensite. To obtain a purely isothermal transformation, specimens sealed in quartz capsules were cooled with the furnace to room temperature in 3 hours. Stabilization of the austenite reduced the transformation temperatures, and the extent of transformation was limited to about 25% martensite. The investigation was carried out at temperatures of -55, -68, -94, -114, -129 and -155 °C. It was found that the temperature dependence of the rate of nucleation is represented by a curve with a maximum. The absolute value of the rate, n, falls continuously and progressively as the degree of transformation rises, reaching zero when transformation is complete. The authors attribute such a variation of n to the dislocational nature of the martensite transformation; as direct evidence of this they give the fact that the number K of particles or volumes participating in the transformation 10^9 is close to the number of dislocations reported by other workers (Ref.10: N.P. Allen, Journal of the Iron and Steel Institute, v.191, 1959). Direct evidence was provided by an experiment in which the austenite structure after ultra-high-frequency micro-plastic deformation, followed by cooling to room temperature, was etched to show the dislocational faults in the plane of the polished section. Cooling to low temperatures then produced the martensite transformation; the needle relief developed preferentially at points where dislocation faults had been found. The relation between n and K is given by:

$$n = K \cdot e^{-\frac{U}{RT}} \cdot e^{-\frac{A_3}{RT}} \qquad (6)$$

where U is the activation energy, A_3 the work of formation of a nucleus, or by:

Kinetic and geometrical characteristics... S/129/61/000/011/002/010
E111/E135

$$n = K_o \left[1 - \left(\frac{V}{V_{max}} \right)^3 \right] \cdot e^{-\frac{U}{RT}} \times e^{-\frac{A_3}{RT}} \qquad (9)$$

where K_o is the initial value of K, U is independent of temperature and degree of transformation and is about 940 cal/g. atom; A_3 is independent of the degree of transformation but its value falls from 4670 at -50 °C to 2360 cal/g.atom at -[illegible]5 °C. The thickness, length and volume of martensite crystals are practically independent of temperature, being entirely governed by degree of transformation. At the completion of the transformation the decrease in the thickness and length reaches 15-18%, due to change in the state and decrease in the volumes of untransformed austenite.

There are 10 figures, 3 tables and 12 references: 9 Soviet-bloc and 3 non-Soviet-bloc. The English language references read as follows:

Ref.6: M. Gensamer, E.B. Pearsalla, G. Smith, TASM, v.28, no.2, 1940.

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Ref.8: C.H. Shit, B.L. Averbach, M. Cohen.
Journal of Metals, v.7, 1955.

Ref.10: N.P. Allen, Journal of the Iron and Steel Institute,
v.191, 1959.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut
(All-Union Machinery Correspondence Institute)

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26212

S/148/61/000/001/011/015
A161/A133

18 7500

AUTHORS: Blanter, M. Ye., and Mashkov, A. K.

TITLE: Isothermic transformation of supercooled austenite in binary iron-chromium alloys

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 1, 1961, 160 - 165

TEXT: The results are given of an experimental investigation carried out in view of insufficient literature data on the kinetics of the isothermic decomposition of austenite in Fe-Cr alloys. The carbon-free alloys were prepared in an induction furnace from armco-iron. Investigation data for one of the studied alloys, with 9.18% Cr, and its isothermic austenite transformation diagram had been published by the authors previously (Ref. 5: Blanter and Mashkov, Metallovedeniye i termicheskaya obrabotka metallov, 1959, no. 1). The chemical composition and Ac_3 ranges of the four other alloys are the following:

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Isothermic transformation of supercooled...

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The alloy index:	(%) Cr	C	Si	Mn	Ni	Ac_3 range, °C
X4	4.32	0.02	0.18		0.29	825-880
X7	6.85	0.03	0.16	-	0.29	815-858
X11,5	[illegible]	0.05	0.20	0.12	0.28	820-875
X12,6	12.63	0.02	0.36	-	0.29	822 (beginning)*

* The X12,6 alloy is subjected only to a partial α-γ-transformation.

The transformation ranges were determined with a Chevenard dilatometer, and the transformation kinetics studied with an anisometer. The austenization temperature in 3 mm diameter and 30 mm long specimens exceeded by 50°C the temperature of the $\alpha \rightarrow \gamma$ transformation end; the holding time was 5 min. Specimens of X12,6 were heated to 920°. The information includes diagrams indicating the kinetics variations in the four alloys with increasing Cr content, and four photomicrographs. Conclusions: 1) An addition of up to 9% Cr results in an abrupt inhibition of decomposition of supercooled austenite. A further increase of the Cr-content to 11 and 12.6% has practically

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24212

no effect on the transformation rate. This is due to the peculiar effect of Cr on the position of A_3 temperature and hence on the difference of free energy values of $\alpha-\gamma$-phases. 2) An addition of Cr extremely increases the stability of supercooled austenite in the upper temperature range near the martensite point. 3) An addition of Cr decreases the martensite transformation range. The isothermic transformation time of austenite into martensite is not clearly connected with the alloy composition. 4) The structure formation during supercooled austenite transformation in carbon-free alloys is either by diffusion and a resulting grainy structure, or by the martensitic process with a resulting acicular structure. It may be assumed that drop ferrite forms as in the following. When acicular alpha structure is forming below the recrystallization threshold of austenite but above the ferrite threshold - the diffusion process of alpha recrystallization leads to a breaking up of the martensite "needles". Thus, the so-called "droplet" ferrite forms from acicular structures in connection with subsequent recrystallization after transformation, because the temperature threshold of ferrite recrystallization is lower than the threshold of austenite. There are 5 figures and 5 Soviet-bloc references.

24212
S/148/61/000/001/011/015
A161/A133

Isothermic transformation of supercooled...

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Institute of Mechanical Engineering)

SUBMITTED: May 27, 1960

Fig. 4. The effect of Cr on the position of the martensitic transformation range

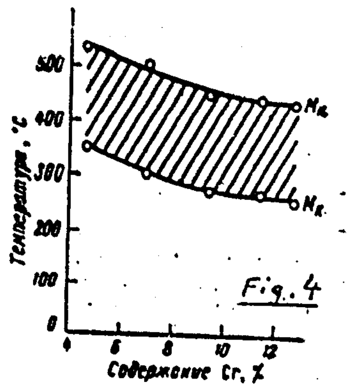


Fig. 2. The effect of Cr on the austenite transformation rate in high temperature ranges (at 700°C isotherm). 1 - X4; 2 - X7; 3 - X9; 4 - X11,5; 5 - X12,6.
(1) - Transformation degree, in %;
(2) - Time, min

Card 4/5

Isothermic transformation of supercooled...

Fig. 2. (continued)

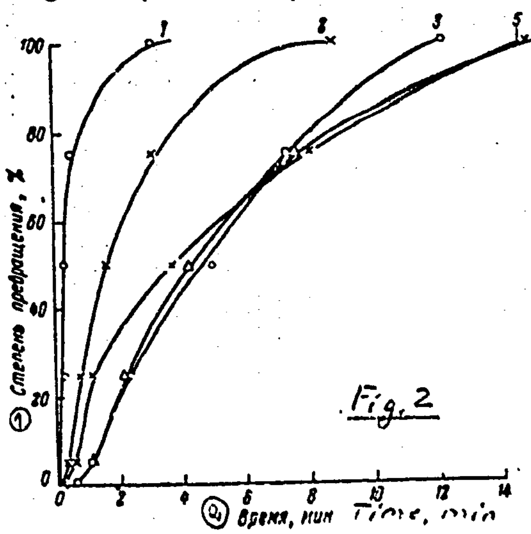
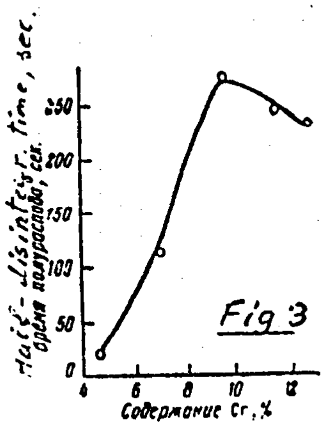


Fig. 3. The effect of Cr on the half-disintegration time of austenite at 700°C



Card 5/5

BLANTER, M.Ye., red.; OZERETSKAYA, A.L., red. izd-va; ISLENT'YEVA, P.G., tekhn. red.

[Phase transformations in steel] Fazovye prevrashcheniia v stali. Moskva, Metallurgizdat, 1961. 167 p. (MIRA 15:7)
(Steel—Metallography) (Phase rule and equilibrium)

S/032/61/027/008/005/020
B107/B206

AUTHORS: Blanter, M. Ye., Koryagin, K. P., Martishyn, O. V., and Galov, A. G.

TITLE: A method for the determination of the hardenability of a steel with reduced hardenability

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 8, 1961, 978-980

TEXT: A method for determining the hardenability of low-carbon steels (0.1-0.2 % C) was elaborated. The two types used were Сталь3 (Stal' 3) and Сталь15 (Stal' 15). The specimens were not of the usual L shape, but had the shape of a truncated cone (90 mm high, lower diameter 25 mm, upper diameter 5 mm). After quenching from 900°C in 8-15 % NaOH, the specimens were cut in half along the axis and polished, and the Vickers hardness was then determined along the axis. Its variation along the axis is approximately given by the equations $H_V = 376 - 5.7x + 0.035x^2$ (for steel 15) and $H_V = 380 - 3.7x + 0.02x^2$ (for steel 3), respectively. H_V is the Vickers hardness, and x is the distance from the upper end of the truncated

Card 1/3

S/032/61/027/008/005/020
B107/B206

A method for...

cone. Cylinders with a diameter of 8-20 mm and a height-to-diameter ratio of 4 were cut from the same steels. After quenching, the cylinders were cut perpendicular to the axis, and the radial change of the Vickers hardness was investigated. It follows the equation $H_V = A + Bx_1^2$. x_1 is the distance from the cylinder center; A and B are coefficients (see Table). From the relations mentioned it is possible to calculate the values of x and x_1 for which the rate of cooling is equal. It is thus possible to calculate the hardness of a cylinder by determining the hardness on a conical specimen. The relation holds for any steel, since the criterion of equal hardness virtually corresponds to the same rate of cooling. A nomograph was drawn for the relation (Fig.). An example is calculated to illustrate the mode of operation. There are 5 figures, 2 tables, and 2 Soviet references.

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Machinery Correspondence Institute)

Card 2/3

BLANTER, M.Ye.; MASHKOV, A.K.

Changes of electric resistance and thermoelectromotive force in the process of $\alpha \rightleftarrows \gamma$ iron alloy transformation. Fiz. met. i metalloved. 11 no. 2:194-202 F '61. (MIRA 14:5)

1. Vsesoyuznyy zaochnyy mashinostroitel'nyy institut.
(Iron alloys—Metallography) (Thermoelectricity)

BLANTER, M.Ye.; KORYAGIN, K.P.; MARTISHIN, C.V.; GALOV, A.G.

Methods for determining the hardness penetration of low hardenability steels. Zav.lab. 27 no.8:978-980 '61. (MIRA 14:7)

1. Vsesoyuznyy zaochnyy mashinostroitel'nyy institut.
(Steel--Testing) (Hardness)

BLANTER, Mikhail Yevseyevich; BOKSHTEYN, S.Z., red.; BERLIN, Ye.N., red. izd-va; VAYNSHTEYN, Ye.B., tekhn. red.

[Phase transformations during the heat treatment of steel] Fazovye prevrashcheniia pri termicheskoi obrabotke stali. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1962. 268 p. (MIRA 15:2)
(Steel--Heat treatment)
(Phase rule and equilibrium)

BLANTER, M.E.; KULAKOV, N.A.; SERGHELICEV, I.M.[Sergeychev, I.M.]

Hardening of steel massive items in the mixtures of air and water. Analele matalurgie 16 no.1:170-182 Ja-Mr '62.

ALFEROVA, N.S., doktor tekhn. nauk; BERNSHTEYN, M.L., kand. tekhn. nauk; BLANTER, M.Ya., doktor tekhn. nauk; BOKSHTEYN, S.Z., doktor tekhn.nauk; VINOGRAD, M.I., kand. tekhn.nauk; GAMOV, M.I., inzh.; GELLER, Yu.A., doktor tekhn. nauk; GOTLIB, L.I., kand. tekhn. nauk; GRDINA, Yu.V., doktor tekhn.nauk; GRIGOROVICH, V.K., kand. tekhn. nauk; GULYAYEV, B.B., doktor tekhn. nauk; DOVGALEVSKIY, Ya.M., kand. tekhn. nauk; DUDOVTSEV, P.A., kand. tekhn. nauk [deceased]; KIDIN, I.N., doktor tekhn. nauk; LEYKIN, I.M., kand. tekhn. nauk; LIVSHITS, B.G., doktor tekhn. nauk; LIVSHITS, L.S., kand.tekhn. nauk; L'VOV, M.A., kand. tekhn. nauk; MEYERSON, G.A., doktor tekhn. nauk; MINKEVICH, A.N., kand. tekhn. nauk; NATANSON, A.K., kand. tekhn. nauk; NAKHIMOV, A.M., inzh.; NAKHIMOV, D.M., kand. tekhn. nauk; OSTRIN, G.Ya., inzh.; PANASENKO, F.L., inzh.; SOLODIKHIN, A.G., kand. tekhn.nauk; KHIMUSHIN, F.F., kand. tekhn. nauk; CHERNASHKIN, V.G., kand. tekhn. nauk; YUDIN, A.A., kand. fiz.-mat. nauk; YANKOVSKIY, V.M., kand. tekhn. nauk; RAKHSHTADT, A.G., red.; GORDON, L.M., red. izd-va; VAYNSHTEYN, Ye.B., tekhn. red. (Continued on next card)

ALFEROVA, N.S.--- (continued) Card 2.

[Metallography and the heat treatment of steel]Metallovedenie i termicheskaia obrabotka stali; spravochnik. Izd.2., perer. i dop. Pod red. M.L.Bernshteina i A.G. Rakhshtadta. Moskva, Metallurgizdat. Vol.2. 1962. 1656 p. (MIRA 15:10)

(Steel--Metallography)
(Steel--Heat treatment)

BLANTER, M.Ya., prof., doktor tekhn.nauk; SHTEYNBERG, M.M., prof., doktor tekhn. nauk, retsenzent; FRID, L.I., inzh., red.; SOKOLOVA, T.F., tekhn. red.

[Metallography and the heat treatment of metals] Metallovedenie i termicheskaia obrabotka. Moskva, Mashgiz, 1963. 416 p. (MIRA 16:8)

(Metallography) (Metals--Heat treatment)

ACCESSION NR: AT3008650 S/2598/63/000/009/0264/0269

AUTHORS: Blanter, M. Ye.; Samsonov, V. P.; Bay, A. S.; Maslovskiy, V. A.

TITLE: Effect of the structure of titanium on the structure of its scale

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 9, 1963, 264-269

TOPIC TAGS: titanium, titanium sponge, TG-00, scale, stratification of scale, color of scale, color of stratification of scale, color of scale strata

ABSTRACT: The paper describes an experimental investigation of the oxidation of Ti which apparently is affected both by the antecedent treatment of specimens (rolling, vacuum anneal, etc.) and by the different purities of the metal employed. The specimens used were prepared from Ti sponge TG-00, pressed into electrodes which were melted in a vacuum arc furnace. The ingots obtained were machined to achieve a pure surface and were hammer-forged to a thickness of 20 mm, hot-rolled to 2-mm thickness, and annealed for 30 min at 700° in an electric chamber furnace. Scale was removed by etching in a fusion of NaOH and $NaNO_3$; reaction products were removed by H_2SO_4. Cold rolling to 1-mm thickness and cutting to 10x14-mm specimens followed. 30-min vacuum anneal at 10^{-4} mm Hg at 600, 700, 750, 800, 850, 900, and 1,000° followed. Optical microscopy and X-ray diffraction analysis

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ACCESSION NR: AT3008650

shows that the growth of the oxide film at 900-1,000°C on annealed (A) Ti proceeds at a greater rate than on unannealed (UA) material. The scale on Ti consists essentially of 2 layers, a microcrystalline and a columnar layer. In Ti A for 30 min at 1,000° the microcrystalline layer, by contrast with the single layer on UA Ti, consists of two layers which differ in color and grain size. The deeper layer, which is closer to the parent Ti, is darker. X-ray diffraction shows in both cases the presence of rutile. The surfaces of the scale of A and UA Ti differ in color. In A Ti the surface has a bluish-grey color, in UA Ti a yellowish-white color. The oxidation of Ti begins along the grain boundaries. Crystals of newly formed rutile are found. on the surface of the scale. They have a clearly bounded shape and are oriented identically and along straight lines. The growth of the crystals, apparently, has a dendritic character. Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 04Sep63 ENCL: 00

SUB CODE: CH, MA NO REF SOV: 000 OTHER: 004

Card 2/2

BLANTER, M.Ye.; GARBUZOVA, N.Ye.; TORGASHOVA, A.G.

Mechanism of the recovery of strain-hardened iron under the effect of rapid heating. Metalloved. i term. obr. met. no.4: 22-26 Ap '65. (MIRA 18:6)

1. Vsesoyuznyy zaochnyy mashinostroitel'nyy institut.

L 15760-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD(m)-3
JJN/JD/HW

ACCESSION NR: AP4044134 S/0129/64/000/008/0014/0021

[illegible] M. Ye.; Prozorov, L. V.; Lavrent[illegible]

[illegible] thermomechanical treatment [illegible]
on mechanical properties

[illegible] Metallovedeniye i termicheskaya obrabotka [illegible]

[illegible]

[illegible]

Card 1/3

L 15760-65

[illegible] AP4044134

Card 1/2

[illegible]
ACCESSION NR: [illegible]

a reduction of [illegible], the grain area is reduced [illegible] [illegible] however, [illegible]

SUBMITTED: [illegible]

NO REF SOV: 005 OTHER: 000

Card 2/2

BLANTER, M.Ye.; METASHOP, L.A.; AKTSYBUSHEVA, E.I.

Methods of developing the dislocation structure of austenitic steel by etching. Zav. lab. 30 no.1:58-60 '64. (MIRA 17:9)

1. Vsesoyuznyy zaochnyy mashinostroitel'nyy institut.

L 00855-66 EPA(s)-2/EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) JD/HW

ACCESSION NR: AP5020703 UR/0129/65/000/008/0008/0012
621.785:539.374:620.17

AUTHOR: Blanter, M. Ye. 44,55

TITLE: Principles of the combined method of heat treatment and plastic deformation of metals and alloys 44,55

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 8, 1965, 8-12

TOPIC TAGS: superhardening, heat treatment, plastic deformation, cold working, patenting, marforming, maraging, hardened steel, hardened alloy, dislocation theory, recrystallization

ABSTRACT: The development in recent years of the new combined methods of "superhardening" was a consequence of exhaustion of the possibilities for hardening alloys by techniques of heat treatment alone or plastic deformation (cold working) alone. The new types of hardening treatment would hardly have been evolved were it not for the widespread adoption of ideas associated with the presence of linear defects in metal structure -- dislocations. In this connection, the author surveys the possible methods of combined treatment as based on the possible combinations of heat treatment with plastic deformation depending on the sequence in which they are performed: 1. Heat treatment followed by plastic deformation (patenting, marforming); 2. Plastic deformation (of austenite) followed by heat treatment (hardening) (as well as the so-called compound maraging - plastic deformation of carbon-

L 00855-66

ACCESSION NR: AP5020703

free alloyed martensite with subsequent aging); 3. Two successive heat treatments (the combination of two successive hardenings under special conditions); 4. Two successive plastic deformations - this case is possible in theory but has not yet been described in the literature. The main reason for the "superhardening" produced by the combined-treatment method may vary in nature: if a nonsupersaturated solid solution is being plastically deformed, the principal reason for its hardening is the cumulation of geometrical defects of the structure, whereas in the case of a supersaturated solid solution the hardening is mainly attributable to the segregation of carbon from that solution. And of course, the segregation of disperse particles is the main reason for hardening in the case of the aging of iron following plastic deformation (case 2) and without that deformation (case 3). The investigation of the combined methods of treatment on the basis of qualitative theories of dislocation defects is not only of a major practical importance but also makes possible a new approach to many seemingly long-established aspects of work hardening, recrystallization, and phase transformations during the heat treatment of steel and alloys. The quantitative physico-mathematical theory of dislocations, unfortunately, is as yet insufficiently refined to describe such complex crystalline systems as real metals and alloys. Orig. art. has: 1 photo, 2 figures.

L 00855-66

ACCESSION NR: AP5020703

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Machine Building Institute) 44,55

SUBMITTED: 00 ENCL: 00 SUB CODE: MM, SS

NR REF SOV: 003 OTHER: 001

Card 3/3

L 3994-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) MJW/JD/HW

ACC NR: AP5022579 UR/0129/65/000/009/0032/0037

669.784:539:374:620:17:669.15-194:669.26 60 57 B

AUTHOR: Blanter, M. Ye.; Shamiyev, S. Sh.
44,55 44,55

TITLE: Effect of carbon content and cold plastic deformation on the properties of hardened steels 18

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 9, 1965, 32-27

18 18 18,44,55

TOPIC TAGS: steel, chromium steel, steel heat treatment, thermomechanical treatment, steel cold deformation, low temperature treatment, steel mechanical property/Kh2 steel, 18Kh2 steel, 38Kh2 steel, 53Kh2 steel, 67Kh2 steel

ABSTRACT: The effect of low-temperature thermomechanical treatment (cold plastic deformation in the as-hardened or low-tempered condition) on the mechanical properties and structure of Kh2, 18Kh2, 38Kh2, 53Kh2, and 67Kh2 steels, all containing about 2% chromium and 0.019, 0.18, 0.38, 0.53, and 0.67% carbon, respectively, has been investigated. The 30-kg ingots were forged into bars 12 mm in diameter. The cars were annealed, chromium plated, austenized at 860-950C, water or oil quenched, and ground to a diameter of 8 mm or tempered at 180C for 60-90 min and then ground. The specimens were then cold drawn with 2.5-20% reduction, except for as-hardened specimens of 53Kh2 and 67Kh2 steels which were too hard. It was found that cold deformation increased the tensile and, especially, yield strengths of both as-

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L 3994-66

ACC NR: AP5022579

hardened and low-tempered steels in proportion to the magnitude of reduction and carbon content. At 12% reduction, the as-hardened 38Kh2 steel had a tensile strength of 256 kg/mm^2, a yield strength of 252 kg/mm^2, an elongation of 2.5%, and a reduction of area of 5%. Corresponding values for low-tempered steel were 239 kg/mm^2, 237 kg/mm^2, 5%, and 27%. After cold deformation, all low-tempered specimens had a higher ductility than as-hardened specimens. Orig. art. has: 6 figures and 2 tables. [AZ]

ASSOCIATION: Vsesoyuznyy zaochnyy mashinostroitel'nyy institut (All-Union Correspondence Institute of Machine Building) 44,55

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000 ATD PRESS: 4119

2/2

L 32976-66 EWP(k)/EWT(m)/T/EWP(w)/EWP(t)/ETI IJP(c) JD/HW

ACC NR: AP6017522 (N) SOURCE CODE: UR/0148/66/000/001/0145/0148

AUTHOR: Blanter, M. Ye.; Shamiyev, S. Sh.

ORG: All-Union Correspondence Machine Building Institute (Vsesoyuznyy zaochnyy mashinostroitel'nyy institut)

TITLE: Influence of cold deformation on the mechanical properties and structure of quenched iron alloys without carbon

SOURCE: IVUZ. Chernaya metallurgiya, no. 1, 1966, 145-148

TOPIC TAGS: iron alloy, quenching, cold working, mechanical property, metallographic examination, crystal lattice dislocation, crystal lattice structure

ABSTRACT: A study was made of the effects of cold plastic deformation on the mechanical properties and fine structure of iron alloys (containing very low carbon) after quenching. Three alloys were used: N5--0.019% C, 4.83% Ni; Kh5--0.009% C, 5.10% Cr and G5--0.019% C, 5.04% Mn. After quenching from 950°C, these alloys were plastically deformed 5, 9.8, 14.5, 19 and 24% at room temperature. Mechanical properties, x-ray line broadening and prior austenitic grain structures were obtained for each steel in various stages of cold working. Mechanical strength and hardness increased significantly with deformation (245 to 265 VHN for 25% deformation G5) with G5 increasing the most and N5 the least. The higher the strength and the lower the ductility of the al-

Card 1/2 UDC: 669.15-192-13:620.183:620.17

L 32976-66

ACC NR: AP6017522

loy after quenching, the lower was its change in properties after cold deformation. X-ray line broadening was correlated with the increase in mechanical properties and with dislocation structure. Increases in the broadening of (220) and (110) lines were tabulated as a function of alloy and degree of cold work, and the dislocation density was calculated from the observed line broadening. The yield, ultimate strength and the proportional limit were plotted as a function of broadening factor and dislocation density, displaying perfect correlation for broadening factor and dislocation density. Orig. art. has: 5 figures, 2 tables.

SUB CODE: 11/ SUBM DATE: 09Apr65/ ORIG REF: 004/ OTH REF: 001

Card 2/2

L 41015-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6021707 (N) SOURCE CODE: UR/0148/66/000/003/0127/0131

AUTHOR: Blanter, M. Ye; Kumanin, V. I.

43
B

ORG: All-Union Correspondence Machine Building Institute (Vsesoyuznyy zaochnyy mashinostroitel'nyy institut)

TITLE: Effect of recrystallization on persistence of structural defects in deformed austenite

SOURCE: IVUZ. Chernaya metallurgiya, no. 3, 1966, 127-131

TOPIC TAGS: austenitic alloy, metal recrystallization, lattice defect, austenite transformation / N23G3 austenitic alloy

ABSTRACT: To clarify the question whether recrystallization may, to one extent or another, preserve the structural defects induced in a material during its deformation, the authors investigated this effect for the N23G3 austenitic alloy (0.04% C, 23.0% Ni, 3.11% Mn, remainder Fe), following is annealing at 850°C and rolling at 200°C with 10, 20, 30, 40, 50 and 60% plastic deformation. After the deformation, the specimens (10x10x3 mm) were heated in a lead bath at 650, 700 and 750°C for from 15 sec to 2 hr, with subsequent quenching. To accomplish $\gamma \rightarrow \alpha$ transformation, this was followed by sharp cooling to -196°C with subsequent slow

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UDC: 669.24'74:620.183

L 41015-66

ACC NR: AP6021707

heating (10°C/hr) to room temperature. The degree of structural imperfection of the alloy was estimated according to the changes in the physical broadening of X-ray line (311) and the microhardness of the recrystallized and nonrecrystallized grains. The amount of austenite and martensite in the alloy was estimated according to the ratio between the integral intensities of the lines $(111)_\gamma$ and $(110)_\alpha$. The higher the degree DPD of plastic deformation is, the more complete is the degree β_{cr} of recrystallization at the moment of abrupt decrease in the number of defects (Fig. 1). Thus, following DPD = 30% and subsequent heating at 700°C, β_{cr}

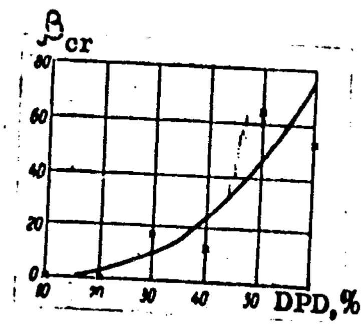

Fig. 1. Effect of degree of plastic deformation DPD on the intensity of recrystallization at the moment of the onset of a sharp decrease in the number of defects

Card 2/3

decreases by 30% compared with β_{def}, and the microhardness of the first recrystallized grains is 102 kg/mm^2, compared with 120 kg/mm^2 when DPD = 50%. This indicates a partial redistribution and disappearance of the defects in the course of polygonization even prior to the onset of recrystallization. The intensity of $\delta \rightarrow \alpha$ transformation is affected by the DPD of the austenite. When DPD = 60% the austenite undergoes stabilization, but when DPD = 40 and 20%, it undergoes destabilization; neither process, however, is complete at the end of recrystallization, thus providing yet another and highly significant proof of the persistence of part of defects in completely recrystallized material. Orig. art. has: 3 figures.

SUB CODE: 11, 20, 13/ SUBM DATE: 24Jun65/ ORIG REF: 008/ OTH REF: 001

L 23312-66 EWT(d)/EWT(m)/EWP(v)/EWP(t)/EWP(k)/EWP(n)/EWP(l) JD/HM

ACC NR: AP6011200 SOURCE CODE: UR/0413/66/000/006/0032/0032

INVENTOR: Semenov, O. A.; Alferova, N. S.; Yankovskiy, V. M.; Kolesnik, B. P.; Ostrin, G. Ya.; Plyatskovskiy, O. A.; Kheyfets, G. N.; Gleyberg, A. Z.; Chemerinskaya, R. I.; Gomelauri, N. G.; Blanter, M. Ye.; Sharadzenidze, S. A.; Suladze, O. N.; Gol'denberg, A. A.; Tsereteli, P. A.; Obiriya, A. Ye. Seperteladze, O. G.

ORG: none

TITLE: Method of manufacturing strengthened tubes. Class 18, No. 179786 [announced by the Ukrainian Scientific Research Institute of Pipes (Ukrainskiy nauchno-issledovatel'skiy trubnyy institut)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 6, 1966, 32

TOPIC TAGS: tube manufacturing, tube rolling, tube strengthening, tube heat treatment

ABSTRACT: This Author Certificate introduces a method of strengthening hot-rolled tubes. According to this method, the hot-rolled tube is quenched immediately after it leaves the first rolling mill, and then is sized or reduced at a tempering temperature. [ND]

SUB CODE: 13/ SUBM DATE: 12Nov63/ ATD PRESS: 4230

Card 1/1 UDC: 621.78.08.621.771.2

ACC NR: AP6035958 (A,N) SOURCE CODE: UR/0129/66/000/010/0062/0063

AUTHOR: Blanter, M. Ye.; Shklyarov, M. I.

ORG: All-Union Machine Building Correspondence Institut (Vsesoyuznyy zaochnyy mashinostroitel'nyy institut)

TITLE: Combined [mechanothermal] treatment of steel to high strength

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1966, 62-63

TOPIC TAGS: carbon steel, mechanical property, high strength steel, ~~mechanothermal treatment~~, ~~steel~~ plastic deformation, ~~steel~~ ~~mechanothermal~~ mechanical heat treatment, steel property/45 carbon steel

ABSTRACT: The effect of mechanothermal treatment, i.e. plastic deformation at room temperature, and subsequent heat treatment on the mechanical properties of 45 carbon steel has been investigated. Steel specimens, 1 x 9 x 100 mm, heat treated to various structures (granular, pearlite, troostite-sorbite, or martensite) were cold rolled with 10, 30 or 50% reduction, rapidly heated to 800, 900, 1000 or 1100C, and water quenched. This was followed by tempering at 200C. It was found that the strength of specimens rolled with 50% reduction increased with the increase of annealing temperature from 800 to 900C. For instance, the tensile strength of specimens with a pearlitic structure increased from 210 to 245 kg/mm^2, and those with a troostite-sorbite structure, to 225 kg/mm^2, at an elongation of 4% in both cases. Further increases in temperature to 1100C decreased the tensile and yield strengths and

 UDC: 669.14.018:621.789

ACC NR: AP6035958

elongation dropped to 1%. The increase of reductions at first lowers the strength characteristics then, starting from 10% to 50% reduction, the characteristics increase steadily. Thus, the steel strength can be improved under certain predetermined conditions of plastic deformation and subsequent hardening with a rapid cooling to austenitizing temperature. Orig. art. has: 2 figures.

SUB CODE: 11, 13/ SUBM DATE: none

Card 2/2

BLANTER, S. G.

Elektricheskoye oborudovaniye tyagovykh podstantsiy.

Moscow, 1948.

348p.

A reference manual and textbook on urban electrical transportation for engineers and technicians dealing with theoretical fundamentals and description of electrical equipment of street car and trolly-bus sub-stations; published by the Ministry of Communal Economy, USSR.

BLANTER, S. G. Engineer Cand Tech Sci

DISSERTATION: "Electrical Equipment of Traction Substations".

18 March 49

Moscow Order of Lenin Power Engineering Inst.

imeni V. M. Molotov

30 Vecheryaya Moskva
Sum 71

BLANTER, S.G., dotsent, kandidat tekhnicheskikh nauk.

[Automatic traction sub-stations (one and two unit)] Avtomaticheskie tiagovye podstantsii (odno-dvukhagregatnye). Moskva, Izd-vo Ministerstva kommunal'nogo khoziaistva RSFSR, 1952. 211 p. (MLRA 6:5)
(Electric railroads--Substations)

BLANTER, Solomon Grigor'yevich; SHILOVSKIY, V.A., red.; RACHEVSKAYA, M.I., red.izd-va; SHLIKHT, A.A., tekhn.red.

[Current converters for traction substations] Preobrazovateli toka tiagovykh podstantsii. Moskva, Izd-vo M-va kommun.khoz. RSFSR, 1959. 258 p. (MIRA 13:4)
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Blanter, Solomon Grigor'yevich

Radiotekhnika i Elektronika (Radio Engineering and Electronics). Moscow, Gosenergoizdat, 1960. 415 p. 27,000 copies printed.

Ed.: S. F. Korndorf; Tech. Ed.: N. I. Borunov.

PURPOSE: The book is intended as a textbook for students in schools of higher education in the "Radio Engineering and Electronics" course specializing in the field "Geophysical Methods of Prospecting for and Surveying Mineral Deposits".

COVERAGE: The book presents the theoretical principles of the operation of electron tubes, of high-vacuum, gas-filled, and other electric vacuum devices, and of semiconductor devices. It describes physical phenomena occurring in them and examines electron amplifiers, oscillators, and rectifying and voltage regulation systems. Problems relating to radio communications and radio measurements are reviewed. Chapter III was written by the author in collaboration with

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K. P. Zhadin, while Chapter VII was written by L. R. Tsvang. No personalities are mentioned. There are 12 references, all Soviet.

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BLANTER, Solomon Grigor'yevich; SHISHKIN, O.P., zasl. deyatel' nauki i tekhniki RSFSR, retsenzent; SOLGANIK, G.Ya., ved. red.; POLOSINA, A.S., tekhn. red.

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Comparison of power characteristics of asynchronous and synchronous electric drives of drilling winches. Elektrichestvo no.8:30-32 Ag '65. (MIRA 18:9)

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J. Kepler's second law. p. 218. GLASNIK MATEMATICKO-FIZICKI I ASTRONOMSKI, Vol. 3, no. 5, 1948.

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Blanuša, Danilo. A type of integral theorems for Bessel functions. Rad Jugoslav. Akad. Znan. Umjet. Odjel Mat. Fiz. Tehn. Nauke 277, 5–128 (1950). (Serbo-Croatian)

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This paper discusses the Laplace convolution of

$$t^m A_\nu(c(t^2-a^2)^{1/2})$$

with other functions of the same form, where A_ν is the entire function occurring in the definition of Bessel functions of the first kind (notation as in Jahnke-Emde). A great many recurrence and other relations are obtained. The work is based partly on previous results by the author [same Rad 271, 83–143 (1948); these Rev. 11, 245]. *A. Erdélyi.*

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Problems of cosmology and cosmogony. p. 183. ALMANAH BOSKOVIC. (Hrvatsko prirodoslovno drustvo) Zagreb. (Annual on astronomy issued by the Croatian Society for Natural Sciences) 1951.

<u>East European Accessions List,</u> Library of Congress, Vol. 1, no. 13, November 1952. UNCLASSIFIED.

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BLANUSA, D. Zagreb, Yugo.

"Eine isometrische Einbettung der elliptischen Ebene im vierdimensionalen euklidischen Raum".

Paper delivered at the International Conference of Mathematicians held in Salzburg, Austria 9-14 September 1952, under the auspices of the Austrian Congress of Mathematicians.

SO: Air, Encl. to USAFE ATI-2569-52, 21 Nov 52 (info: Nov 52, B-2), [redacted].

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Blanuša, Danilo. Les espaces elliptiques plongés isométriquement dans des espaces euclidiens. I. Le plan elliptique. Hrvatsko Prirodoslovno Društvo. Glasnik Mat.-Fiz. Astr. Ser. II. 8, 3-23 (1953). (Serbo-Croatian summary)

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